Engineering Support and Coordination for Justice/Public Safety/Homeland Security

Outputs

- Technical evaluations of industry R&D and community grant proposals.

- Interoperability and performance evaluations of Project 25 equipment.

ITS is conducting a technical program aimed at facilitating effective interoperability and information sharing among dissimilar wireless telecommunications and information systems within the justice/public safety/homeland security community. The primary focal points of the program are: (1) Standards support, (2) Research and Development (R&D) support, (3) Test and Evaluation (T&E), and (4) Technical Coordination among local, state, tribal, and Federal departments and programs associated with interoperability activities. All efforts described here are complementary to the ITS technical programs focused on wireless telecommunications interoperability standardization and information technology interoperability standardization. The ITS program is sponsored by a number of different Federal departments and programs that have a keen interest in public safety interoperability, including: National Institute of Standards and Technology (NIST) Office of Law Enforcement Standards (OLES), National Institute of Justice (NIJ) Communications Technology (CommTech) Program (formerly AGILE Program), Department of Justice Office of Community Oriented Policing Services (COPS), National Communications System (NCS), Department of Homeland Security's Public Safety Wireless Communications (SAFECOM) Program, Federal Partnership for Interoperability Communications (FPIC) (formerly Federal Law Enforcement Wireless Users' Group (FLEWUG)), and NTIA.

Standards Support

Through research conducted in its Interoperability Research Laboratory (IRL), ITS tendered key contributions to standards development organizations supporting justice, public safety, and homeland security goals. In cooperation with NTIA's Office of Spectrum Management, the IRL catalogued the receiver selectivity of a cross section of Land Mobile Radios (LMRs) operating in a variety of simulated environments employing different modulations and conflicting channel plans. The underlying data were used to validate a new radio receiver selectivity model proposed in the draft of TIA Technical Service Bulletin (TSB)-88, Rev. B. Results of Project 25 Radiofrequency Subsystem throughput delay measurements performed on base stations provided a much needed context for anticipated throughput delays in the extended Inter-RF Subsystems Interface (ISSI) currently being specified in the Project 25/Telecommunications Industry Association (TIA) TR-8 committee. IRL engineers are currently reconstructing the Delivered Audio Quality (DAQ) test methodology referenced in TSB-88-B. Effective use of DAQ as a system quality metric for LMR coverage testing has been hampered by the absence of documented, repeatable test methods. The DAQ definition project will provide clear and concise instructions on how to perform such measurements. The published results will be backed by a publicly available, exhaustive compendium of thousands of audio recordings of impaired RF channels.

R&D Support

At the request of several Federal Departments and Programs, ITS worked alongside practitioners from the justice/public safety/homeland security community to technically evaluate grant proposals. By acting as the Government's common "technical thread," ITS engineers helped ensure that R&D proposals from industry and telecommunications integration proposals from local, state, and tribal government agencies were feasible and consistent with long-term interoperability strategies. Evaluations were conducted on behalf of SAFECOM's Request for Information on Rapidly Deployable Interoperability Solutions, the COPS Program, and the Department of Homeland Security's Emergency Preparedness and Response Directorate.

Test and Evaluation

The IRL has been equipped to support a broad variety of testing requirements, especially public safety applications. Testing continues along three radio-centric thrusts: receiver and transmitter performance measurements, interoperability of the common air interface, and evaluation of the effect of interconnect or network impairments. Leveraging the core

automated testing capabilities developed last year, IRL engineers expanded the lab's repertoire of performance tests well beyond the initial suite of Co/Adjacent-Channel Rejection measurements to include several additional tests defined in the TIA-102 suite of standards. Interoperability testing of subscriber units continued with more than 3000 test conditions and dozens of documented functional failures having been observed to date. This first stage of testing illustrated several common functional discrepancies in the subscriber units and motivated more efficient testing methods for future work. Accordingly, IRL engineers continue to lay the groundwork for automated testing through the creation of a standard P25 Superframe generation program capable of simulating nearly every combination of channel parameters in the overhead data. IRL engineers completed an extensive analysis of the effect of latency, jitter, and packet loss on a Project 25 repeater employing a new proprietary Voice over IP (VoIP) protocol. In addition to exhaustively characterizing this device, lessons learned in the course of testing promise to lay the foundation for similar measurements on the aforementioned P25 ISSI. Finally, IRL engineers' core competencies were brought to bear for subscriber radio and infrastructure testing in support of the State of Wyoming's Wyolink radio communications system.

Equipment in the new ITS screen room (photograph by E. Nelson).

Technical Coordination

In FY 2004 ITS entered into a cooperative research and development agreement with the State of Wyoming's Wyolink project team to assist in the proposal, evaluation, and performance testing phases of a multi-year, statewide, VHF trunked LMR system. Practical experience gained in this effort will be applied to the development of Request for Proposal templates which public safety agencies at all levels of government can use to simplify the procurement process and ensure the integrity of the performance confirmation process.

Other Support

In addition to the established areas of activity mentioned above, ITS frequently responds to the immediate needs of its sponsors by performing a variety of other research and applied engineering activities. These activities may include strategic and tactical planning, system engineering, technical analysis, and economic benefit studies.

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